

Teaching (really young) kids to code



Greenfoot

in an enrichment program
for gifted youth



Brian Myers
Northwestern University
Center for Talent Development
www.ctd.northwestern.edu



Northwestern University
School of Education
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For...

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Welcome to Center for Talent Development

Center for Talent Development (CTD), housed at Northwestern University's **School of Education and Social Policy**, is an accredited learning center and research facility that has been taking families' notions of what learning is and introducing them to what learning should be for nearly 30 years. [\[Read more...\]](#)

Our Programs



Northwestern University's Midwest Academic Talent Search (NUMATS) (grades 3 through 9)

provides students with above grade-level testing, a clearer picture of their true abilities, academic counseling and increased test-taking confidence -- a **must-visit site** for every family with students in grades 3 through 9



Summer Program (preK through grade 12)

welcomes residential and commuter students from around the world to enjoy their definition of summer fun -- learning, while making new friends in the Leapfrog, Apogee, Spectrum and Equinox program series

Announcements:

Click on Youtube logo, see a feature on CTD's Summer Program.



Read [testimonials](#) for NUMATS and the ACT and SAT tests continues.

Become a fan of CTD by visiting our page on Facebook. Click button.



Events: [Join all Events!](#)

“The whole CTD

experience was an **eye opener**

for my child.

It showed her that there is a

world out there

she never

dreamed of.”

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BlueJ/Greenfoot Day - SIGCSE 2009

Computer Gaming Academy I

SEPP09-F-42A: Computer Gaming Academy (Intro to Computer Programming)

Instructor:
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Welcome to Computer Gaming Academy I (Intro to Computer Programming). I am certain that you will find this class to be challenging but also very rewarding and fun!

Course Description:
 In this class, we will explore the fundamental concepts of object-oriented programming through a variety of computer game design projects. We will be using a new design application called Greenfoot, which was specifically designed to introduce high school and college computer science students to the basics of programming using the Java programming language. Greenfoot is available as a free download with versions available for Windows, Mac OS and Linux. (To download Greenfoot, follow the instructions under the "Week 2" link.) Everyone must install Greenfoot on their home computers by January 17.

Outcomes:
 Upon successful completion of this course, students will:

- Have a broad general understanding of foundational programming concepts, including inheritance, functions, operators, variables, and conditional expressions ;
- Have a strong familiarity with the basic programming and editing features of the Greenfoot coding environment, and a basic familiarity with open source content editing tools such as ArtRage, Audacity, Avii! Studio, and GIMP;
- Have a broad general understanding of the defining characteristics of digital game genres(e.g. , scroller, maze, tile, platform, RPG) and the history of digital games;
- Create their own single- and multiplayer computer games in at least two of the aforementioned game genres.

Resources and Materials:
 Students are required to purchase a portable flash (aka USB) drive to carry their projects between home and class. Handouts will be provided each week by the instructor and will serve as the basis for discussion during the next week's class. Handouts and sample scenarios may also be downloaded from the class web site. Sources will include:

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Distinctive aspects of working with middle school kids versus upper grade level/university students

At this age, the computer is thought of as a game console.

Expectations must be framed without risk to motivation.

When is snack time?

Prior experience or lack thereof (OS commands, file hierarchy, media editing tools

Parental experience/competencies/guidance.

Limited access/edit media content .

Addressing diverse skill levels and student interests through a differentiated approach

Basic digital competencies acquired on a “need to know” basis

Concept formation: the importance of physicality and play

Low floor – High ceiling – Wide walls

- Providing a low floor most important with this age group: allow them to be successful, instill confidence. This is accomplished through the completion of weekly projects (Green Room) and the provision of simple, discrete tutorials.
- High ceiling: provide challenges on an optional basis (“Going to the Moon” scenario by Randy Gallant and Qusay Mahmoud).
- Wide walls: offer projects that are customizable; offer improvisational in-class activities.

Playful classroom activities provide a foundation of experience

The computer only knows what you tell it: students play the roles of computer and computer programmer.

Simon Says: students play out conditional expressions.

Planet Boolean: where the traffic lights have only two lamps, green and red.

Weekly worksheet projects: students instantiate (walk out) the motions and behaviors of Actor classes (e.g., the enemy motions of Space Invaders)

Windows Internet Explorer - GreenRoom - Windows Internet Explorer
 http://www.greenfoot.org/greenroom/index.php/Worksheets

View Favorites Tools Help
 SiteAdvisor

Worksheets - GreenRoom

GreenRoom

Search Go Search
 History View source Discussion Page

Worksheets

Personal tools
 Log in / create account
 Navigation
 Main Page
 Recent changes
 Worksheets
 Writing a Worksheet
 Worksheet Ideas
 Toolbox
 What links here
 Related changes
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This page contains a list of Greenfoot worksheets. Once you have finished writing your worksheets, please add it to this list in the appropriate section so others can find it easily! If you find any worksheets outside of the wiki, please add those as well.

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Beginner Worksheets

These worksheets are aimed at those just starting out with Greenfoot, with very little or no knowledge of programming.

Updating to 1.5 - There's some API changes introduced in version 1.5 of Greenfoot which might cause a few issues. This shows you the problems that might occur and how to deal with them.

[Adding objects automatically](#) - Learn how to add objects automatically via a world's constructor. You

Internet | Protected Mode: Off
 Greenfoot-spacewar2 Greenfoot Whatever... SIGCSE Worksheets - Green...

<http://www.greenfoot.org/greenroom>

Greenfoot: invaders
Scenario Edit Controls Help

allenWorld

Score: 0

Scenario Information

World classes

- World
- AllenWorld

Actor classes

- Actor
- Shot
- MotherShip
- Ship
- MasterAlien
- Alien
- Score

Compile all

Speed: [Slider]

Act Run Reset

Greenfoot: invaders The GIMP

Greenfoot: spacewarZ sigcse

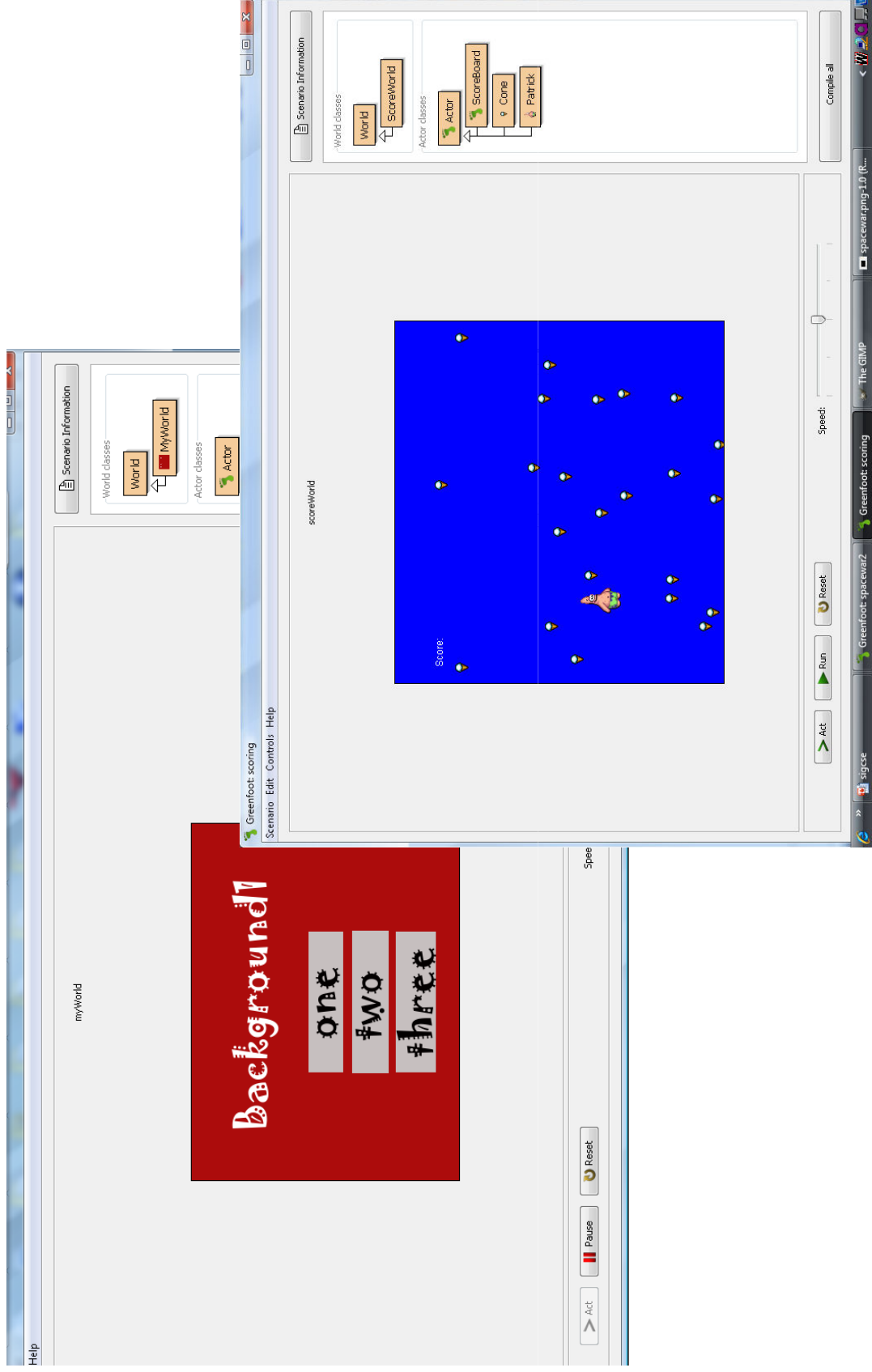
10:34 PM

Scenario created by Michael Berry
<http://www.greenfoot.org/greenroom>



Spacewar: throughout the eight-week session students
build and customize a scroller scenario

BlueJ/Greenfoot Day - SIGCSE 2009



Sample mini-tutorials distributed with accompanying worksheets



Anatomy of a Class File

Previously we said that a class serves as a "blueprint" from which objects are constructed. When you



Anatomy of a Method

All objects in Java obey the rules that have been placed in their class definitions. These rules are called methods, and they define how an object behaves in response to user input or to interaction with other objects.

Methods are named blocks of code that can be called from elsewhere in your program in order to accomplish some task. You have already been using some pre-defined methods in your code. For example, in the code snippet:



How to ... Make objects move

One of the most important and common features of all digital games is the motion of the player character, the enemies, weapons, and even other elements of the environment.

In this handout we examine some of the methods most commonly used to control the motion of objects.

Making objects jump from one location to another

```
setLocation(x, y)
```

The simplest way to relocate an object within a scenario is by using the `setLocation` method, which accepts the x- and y-coordinates of the object as arguments. This method simply relocates the object from any location in the World to the location described within the parentheses.



Space Invader Project

Cheats

For our Space Invader project, we'll be adding methods to both the Ship and the Alien subclasses.

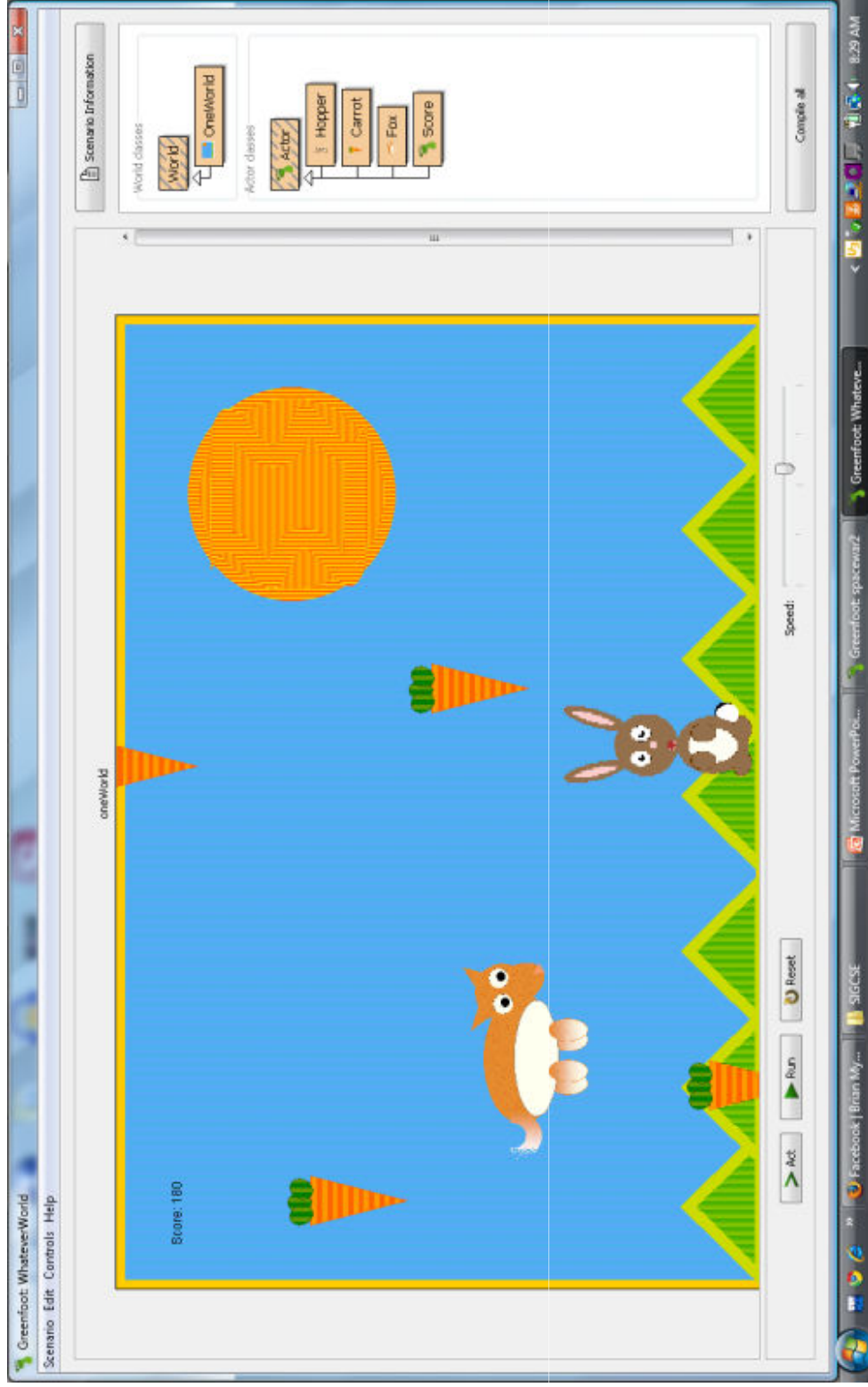
In the case of each of these two, you will need to view the super classes (Mother Ship and Master Alien), in order to find the methods that are available (remember that the subclasses "inherit" their behaviors, e.g., methods, from their respective superclasses).

These cheats will help you find the right code to make your game fully functional and

Limit the number of methods introduced so that the student programmer can achieve mastery of each

addObject()	removeObject()
setLocation()	mouseClicked()
getWidth(), getHeight()	getImage()
getX(), getY()	drawString()
isKeyDown()	setImage()
getRandomNumber()	setBackground()
getOneIntersectingObject ()	playSound()

In truth, our eight-week sessions allow only just enough time to experiment with just a few of the Greenfoot methods.

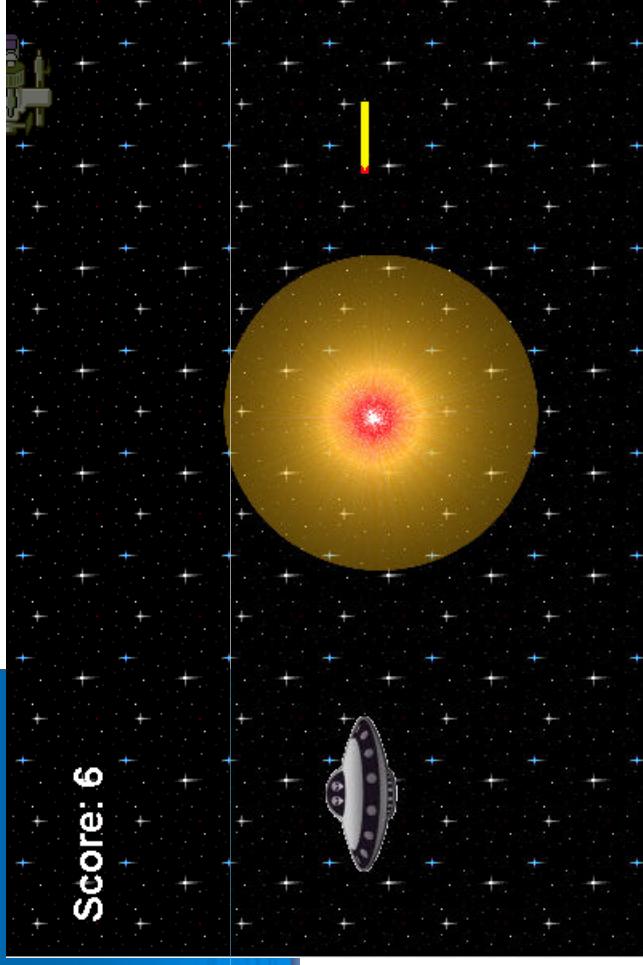


Hopper: collect the carrots and avoid the fox (Molly, age 12).

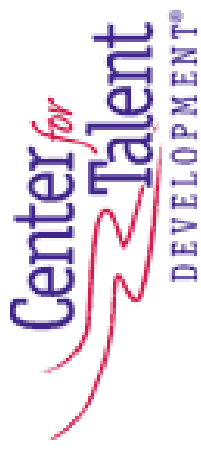


Having Fun with Your Feet...better yet, Greenfoot™

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February 28, 2009
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Spacewar: don't let the enemies reach your fleet! (Nicholas, age 12).



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